CINMS Research Form C

Research Cruise Report

Channel Islands National Marine Sanctuary

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Date	January 7, 2000

VESSEL	R/V Ballena	PROJECT DATES	JANUARY 5, 2000 – JANUARY 7, 2000
PROJECT TITLE	Preliminary Gravity Coring of the Stacked Delta Complex North of the Northern Channel Islands, California		

CRUISE LOG

[daily account of activity, approximate positions, and general observations (per permit requirements)]

01.05.2000

Ballena in harbor. Unable to leave due to broken hydraulic ram.

01.06.2000

Ballena in harbor all morning while fixing ram and replacing blown fuses.

Left harbor approximately 1200 across the Santa Barbara Channel towards northwest Anacapa Island. Between 1400 and 1630, Four gravity cores were taken. Conditions were generally windy and clear.

Core	Latitude	Longitude
01	34.0672	-119.4302
02	34.0747	-119.4392
03	34.0689	-119.4340
04	34.0705	-119.4404

Anchorage was made for the night in Pelican Bay off Santa Cruz. About 2330, the wind started to become very strong, and the decision was made to move the ship to Forney's Cove, which would offer better protection from the wind coming out of the northwest.

01.07.2000

Crew woke at 0600, ate breakfast and got underway at approximately 0730. Between 0800 and 1500, 9 additional gravity cores were taken in the waters north of and between Santa Cruz and Santa Rosa. Conditions were breezy and clear in the morning turning to calm and sunny in the afternoon.

Core	Latitude	Longitude
05	34.1154	-120.0382
06	34.1045	-120.0430
07	34.1240	-120.0222
08	34.1321	-120.0096
09	34.1401	-119.9086
10	34.1278	-119.9060
11	34.1227	-119.8535
12	34.1223	-119.8279
13	34.1255	-119.8321

The Ballena started to head back across the Santa Barbara Channel at approximately 1500 and arrived in the Santa Barbara Harbor by 1700.

AMENDMENTS TO CRUISE PLAN/ COMMENTS

Comments:

Taking into account the delays and shortened trip caused by the broken hydraulics, the trip would still have to be considered a success. The samples appear to be of fairly high quality and should prove very useful. I would like to again thank NOAA and the Channel Islands National Marine Sanctuary for their generosity and cooperation. Hopefully plans for another trip in the near future can be made. I believe that by correcting the problems with the winch, and possibly adding a bit more weight to the corer, we can get better penetration in the muds and fine sands and hit the target locations more accurately.

	The crew consisted of: from Southern Illinois University –Carbondale Steven Cochran Dean Vestal Christopher Williams from Channel Islands National Marine Sanctuary Adam Petuskey Marcus Lebeck
PROJECT RESULTS	[attach a 1-2 page summary of results (per permit requirements), including all relevant materials] The objective of this work was to collect samples that would allow a preliminary analysis of the sediments that form a stacked delta complex on the continental shelf and slope north of Santa Cruz and Anacapa Islands. The stacked delta's are well imaged in previously available USGS seismic-reflection grids, however the nature of the sediments that make up the stacked delta's was unclear. A series of shallow (0-2 meter) gravity cores were to be collected to get an initial idea of what those sediments are. The samples will be used to ascertain texture, near-surface stratigraphy, and fossil content of the sediments. This information would be used for several purposes, including: 1) A basis for locating future cores to be taken in the area. 2) Basic information to support the Master's Thesis of Steven Cochran At this point, work is ongoing with respect to the description and analysis of the cores. Preliminary data indicates that the cores should prove extremely useful in the determination of the geologic history of the Northern Channel Islands, especially during late Quaternary sea level lowstands. What follows is an explanation of the reason each core was taken, as well as any data available about that core at this point. Final results will, of course, be provided to the Channel Islands Marine Sanctuary when they become available. Stages referred to are those of the marine oxygen isotope record, which correlates to even numbered stages being sea-level lowstands (glacial maxima) and odd numbered stages be sea-level highstands (glacial minima). The holocene is stage 1 with the last lowstand being stage 2. Much of the core siting information was provided by Dr. Christopher Sorlien of the Lamont-Doherty Earth Observatory. *Core 01* 70 cm long. This core was to take a sample of a flat bedded sequence that is presumed to be the youngest in the area; perhaps Stage 6, stage 2, or even Holocene. Initially it has been assumed to be Stage 6. *Core 02* 26 cm long. This core was into the toe of what could be stage 8. Core 2 (along with several other cores), was extruded and described on the deck of the Ballena. It graded from fine sand and mud at the top to very fine sand mixed with mud at the bottom. It was dark olive gray in color, and contained extremely abundant shell hash (about 25-40% by volume). The shell hash contained an unusually large number of sea urchin spines compared to some of the other cores. Several samples were retained for grain size and composition analysis. *Core 03* 85.5 cm long. This is a good sample of what is stage 2 or stage 6. The seismic-reflection profiles in this location imaged two very distinct units. *Core 04* 81.5 cm long. Core 4 hit right on target. This core was taken for several reasons. First, it is probable that due to the slope in this location, there is probably not a lot of overburden. Second, this core should allow for the distinction to be made in the seismic interpretation between two of the youngest sequences. *Core 05* 36 cm long. It was determined that this location would be the best for radiocarbon dating, though due to shallow retrieval, this may no longer be the case. At this location there is a double sequence in the seismic that could be dryas and stage 2, stage 2 and stage 6, or even Holocene sediments. The location appears to fall on the outer, older sequence of double sequence. Core 5 was also extruded and described aboard the

Ballena. It contained dark olive gray fine sands and muds at the surface that graded into medium sand and mud at the bottom of the core. This medium sand appears to be the coarsest grain size fraction of the samples taken.

Core 06

45 cm long. Core 6 was a bit off of the intended target, and it is unclear from the seismic what is being cored here. Core 6 was also extruded and described on board. It grades from very fine and fine sandy mud at the top to fine sand at the 34 cm mark. At 34 cm, there is a distinct color change from dark olive gray to olive gray. At this color change, the shell fragments also become more abundant (15-20%). The color change may represent the stage 2 surface.

Core 07

42 cm long. This may be one of the stage 5 sequences, or just overburden. This location was about 300 m west of the intended target of a parallel –bedded sequence between 2 prograding sequences. There is also the slight possibility that due to the location, we have moved into the stage 2 sequence.

Core 08

62 cm long. This core hit what appears to be the best place on the seismic line to get a sample. This is into a prograding sequence that is inferred to be called stage 14.

Core 09

61 cm long. This is either into the base of the stage 12 sequence, or the top of the presumed transgressive sequence that separates stage 12 from another lowstand sequence below. The chance of very little overburden on this core are excellent, therefore it may be an excellent core for stratigraphy / microfossil analysis.

Core 10

30 cm long. This is another core into what is being called the stage 2 sequence. Core 10 was extruded and described on board the Ballena. It is a shell hash mixed with very fine to medium sand with very little mud (<10%) that grades to moderately muddy (10-25%) at the bottom.

Core 11

44 cm long. Core 11 hit right on target. It is into the toe of the stage 2 sequence, assuming that it got through the overburden that may or may not be present. Faunal analysis should tell.

Core 12

30 cm long. Core 12 was into or next to an odd bump on the seismic that may be several different things. It could possibly be overburden, a small slide block, or the edge of a paleo stream-channel. Core 12 was also extruded and described in the field. It is described as fine to very fine sand with a large amount (50%) of shell fragments. It contained scattered patches of extremely prolific shell material (90%). Core 12 has the distinction of being the only core (so far) to undergo a fossil analysis by Dr. James Kennett of UCSB. Kennett has determined that the samples taken from this core to be interglacial, based on the assemblages of shells in the sediment.

Core 13

22 cm long. Core 13 was quite a bit off target, but appears to be promising non-the-less. This core appears to have been located in what would be stage 12, assuming it penetrated the overburden. Possible follow-up later with a echo-sounder recording the location may help to determine exactly what is in this location, as it veers a bit of the seismic grid.